Applicant: Wen-Jian Lin
Application No.: 10/714,700

Remarks

Claims 1-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,195,14 to Kubo in view of U.S. Patent No. 4,431,272 to Yazawa.

According to the Action, Kubo discloses a method of manufacturing a thin film transistor liquid crystal structure including the steps of: (e) forming a conducting layer 241 on said insulating layer 201 and said second semiconductor structure 211; (f) etching said conducting layer 241 to define a source region and a drain region 243 and a curved structure 242; and (g) forming a transparent electrode 246 on said curved structure 242. However, Kubo does not teach or suggest "a curved structure with an inclination" as recited in claim 1. The claimed curved structure with an inclination is simultaneously formed by directly etching said conducting layer when a source region and a drain region are formed. The claimed technique reduces the manufacturing cost, simplifies the manufacturing process, and has better performance on light scattering than Kubo. Therefore, the method of the present invention is novel and non-obvious over Kubo.

Since Kubo does not teach or suggest the curved structure with the inclination, the direction of light scattering is quite difficult to be controlled, which is the limitation that the present invention overcomes. With reference to Fig. 38C of Kubo's patent, on the curved structure, the interlayer insulating film 244 is formed thereon, which is inapposite to the claimed transparent electrode formed thereon.

As also described in Kubo Column 38, lines 64-67 and Column 22, lines

47-59, the polymer resin is applied to form the interlayer insulating film 244 in order to enhance the light scattering. That is to say, Kubo is pertinent to the prior art, and the cost of manufacturing according to Kubo's (and the prior art) method is expensive.

Yazawa discloses a liquid crystal display device comprising an opaque reflective electrode on the lower plate, and the reflective electrode has a rugged surface with an inclination. (Column 3, line 67 through Column 4, line 9 and shown in Figs. 1a-1c, and 4a). The rugged surface is a curved structure with an inclination, but it is different from the curved structure of the present invention. It is not formed by directly etching the conductive layer as claimed. As can be seen in the abstract of Yazawa's patent, the rugged electrode is an aluminum electrode, and the rugged surface is obtained by first depositing an insulating layer of Si02 by CVD and selectively etching the layer of Si02 at an angle between 0-30 degrees to form the rugged surface.

In addition, the Si02 can also be treated by plasma spray and a resist is applied thereto. Therefore, Yazawa does not teach or suggest the curved structure with an inclination formed by directly etching a conductive layer. Furthermore, Yazawa' plasma spray for forming the aluminum curved structure with an inclination would damage the gate dielectic layer and the semiconductor layer. When Yazawa is applied to the present invention, it would make the thin film transistor device fail to operate. So the claimed invention is not taught or suggested in Yazawa.

According to the present invention, a conducting layer is directly etched to define a source region and a drain region and a curved structure with an inclination simultaneously, and the transparent electrode is formed directly on the curved structure for being electrically contacted with said source region and said drain region. The non-obviousness of the present invention is based on the precise etching, i.e. the angle of the inclination can be precisely controlled by adjusting the over-etching time in cooperation with the photomask of an appropriate line width to form the awl-shaped or conical conducting structures as desired. Therefore, the present invention is patentable over Kubo even in view of Yazawa.

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In conclusion, neither Kubo's nor Yazawa's patent has disclosed the curved structure with the inclination formed by etching the conducting layer directly, of the present invention. Therefore, the Applicant respectfully submits that none of the references cited in the Action, or any combination thereof, renders the amended Claims 1-11 obvious. The present invention is patentable over the cited references, and reconsideration and allowance of the present patent application are respectfully requested.

Respectfully submitted,

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